CURRICULUM VITAE

Yeo-Jin Chung

Personal Data

Status:	Citizen of South Korea Born June 27th 1973 in Seoul, South Korea
Gender:	Female
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Phone:	+1 (949) 854 – 1954 (home) +1 (949) 929 – 7510 (cell)

Education

6/98 - 6/02:	**University of California, Irvine** Ph.D. in Applied Mathematics, 2002 Thesis Advisor: Professor Edriss S. Titi Dissertation Title: "*Global Regularity and Inertial Manifolds for the Moore–Greitzer Model of Turbo–Machine Engine and Modeling of Pulse Propagation in Certain Optical Fibers*".
9/96 - 6/98:	**University of California, Irvine** M.S. in Applied Mathematics, 1998.
3/92 - 2/96:	**Ewha Womans University** Seoul, South Korea B.A. in Mathematics, 1996.

Professional Experiences

1/01 - 9/01:	**Graduate Research Assistant** Center for Nonlinear Studies, Los Alamos National Laboratory.
6/00 - 9/00:	**Graduate Research Assistant** Center for Nonlinear Studies, Los Alamos National Laboratory.

Teaching Experiences

1/97 - 5/00: **Teaching Assistant**
Calculus, Linear Algebra, Statistics, Ordinary Differential Equation, Complex Analysis
Department of Mathematics, University of California, Irvine.

Publications

Y. Chung, E. S. Titi: *Inertial Manifolds and Gevrey Regularity for the Moore–Greitzer model of turbo–machine engine*, Journal of Dynamics and Differential Equations (submitted).

F. G. Omenetto, Y. Chung, D. Yarotski, T. Schaefer, I. Gabitov, and A. J. Taylor: *Phase analysis of nonlinear femtosecond pulse propagation and self–frequency shift in optical fibers*, Optics Communications (submitted).

M. Chertkov, Y. Chung, A. Dyachenko, I. Gabitov, I. Kolokolov, and V. Lebedev: *Shedding and interaction of solitons in a weakly disordered optical fiber*, preprint.

F. G. Omenetto, Y. Chung, I. Gabitov, and A. J. Taylor: *Genetic Algorithm pulse shaping for optimum femtosecond propagation in optical fibers*, preprint.

Conferences and Workshops

11/01: **AMS Western Sectional Meeting**
Invited speaker of the session on PDEs and Applications
University of California, Irvine
Invited Talk: On the solution regularity and its long time behavior for the Moore–Greitzer model of turbo–machine engine.

7/01: **Ultrafast Optics Conference 2001**
Montebello, Canada
Contributed Poster: Modeling femtosecond pulse propagation in optical fibers.

3/01: **Workshop on Statistical and Nonlinear Physics of Fiber Communications**
Center for Nonlinear Studies, Los Alamos National Laboratory
Contributed Talk: Modeling of femtosecond pulse propagation in optical fibers.

Computer Skills

C++, Fortran, Matlab, Unix, Linux, Windows, Mathematica, LaTeX.

Awards and Honors

10/01: **Fall 2001 Regents' Dissertation Fellowship**
Department of Mathematics,
University of California, Irvine.

5/01: **Faculty Endowed Fellowship**
School of Physical Sciences,
University of California, Irvine.

Areas of Research

• Applied and Computational Mathematics • Dynamical Systems
• Perturbation Theory • Theory of Nonlinear Fiber Optics

Research Experiences

Nonlinear Fiber Optics: **Ultrashort pulses in optical fibers**
Modeling of high power ultrashort pulse propagation
Pulse shaping using Genetic Algorithms
– Joint work with F. G. Omenetto in Material Science and Technology Division, and I. Gabitov in Theoretical Division, Los Alamos National Laboratory.
Soliton interactions in imperfect optical fibers
Incorporation of the random dispersion and statistical evaluation
Development of a numerical tool to study the interaction between solitons and radiation
– Joint work with M. Chertkov, I. Gabitov in Theoretical Division, Los Alamos National Laboratory.

Fluid Dynamics: **Analytical study of the Moore–Greitzer model of turbo–machine engine**
– Supervision of E. S. Titi in University of California, Irvine.

7/01: **Workshop for Graduate Students on Mathematical Modeling in Industry**
Institute for Mathematics and its Applications, University of Minnesota.

7/99: **Summer Modeling Workshop**
Department of Mathematics, North Carolina State University.

References

Edriss S. Titi:
Professor, Department of Mathematics,
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Ildar Gabitov:
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Future Research Statement

Yeo-Jin Chung

The project on the nonlinear fiber optics has been conducted in collaboration with experimental and theoretical groups of scientists at Los Alamos National Laboratory. I plan to explore further this subject of research with team, which will increase the chances of making significant progress in this project.

Optical fibers are often disordered since it is not guaranteed to achieve a 100% control of the fiber parameters in the process of fiber pulling and pre-form manufacturing. Moreover the effect of the disorder accumulates along the pulse propagation, which results in seriously impeded solitons. Therefore, in practical telecommunications, especially long-distance fiber communications, it is highly demanded to understand the pulse behavior and control the optimum values in the presence of randomly varying fiber parameters.

In this line of research, the project I would like to pursue is the randomly varying birefringent fibers, which are the cases of real fibers due to the fiber distortion in manufacturing. In this line of research, I am interested in providing a model including the effects of random polarization mode coupling. In addition, I would like to extend the analytical study based on this model. Finally, I intend to modify the readily developed numerical method based on the new model. This will provide an opportunity to combine the theoretical study with numerical experiments. As a result, the validity of both analytical and experimental observations will be rigorously established.

Understanding the ultrashort pulse propagation would aid in the understanding of various issues such as the delivery of ultrashort pulses through fibers for medical applications and imaging, continuum recompression and control from highly nonlinear photonic crystal fibers as well as the design and implementation of the next generation of telecommunications systems.

Recently, noticeable performance of the photonic crystal fiber (PCF) (a long thread of silica glass with a periodic array of air holes) has been reported. Although it is known that photonic crystal fibers have remarkable properties, this high-index core fiber has a complex nature of a cladding structure, which prevents the use of methods from the conventional fiber theory. Modeling ultrashort pulse propagation in the PCFs is, therefore, extremely challenging task, which requires a rigorous theoretical tool. In collaboration with the experimental group at LANL I plan to develop a reliable model to describe the performance of femtosecond pulse propagation on PCF, and to compare the analytical and computational results of this model with experimental data.

The Genetic Algorithm Pulse Shaping (GAPS) provides insight to the construction of experimental tools for successful transmission of pulses in femtosecond regime. GAPS is specially, useful in situations where theoretical prediction is difficult or when experimental conditions are not consistent. This technique can be a very useful method to evolve towards an optimal optical field. For instance, the genetic algorithm can be employed to find the optimal filter which allows the pulse to propagate through optical fiber without broadening its width when applied to an input pulse. In this case, one can successfully perform the transmission of multiple pulses without losing their peak intensities, which is highly desirable in modern telecommunication applications.

I plan to apply the genetic algorithm to propagation of ultrashort pulses in optical fibers. In particular, I am interested in utilizing sophisticating filters such as a smooth (grayscale) amplitude filter, a phase filter and a combination of the two. My aim is to provide different pulse shaping process using various types of filters to achieve better performance of pulse transmission than present results and to also apply this process to extended cases such as the pulse propagation on photonic crystal fibers.

References

[1] A. Arnold, *Numerically absorbing boundary conditions for quantum evolution equations*, VLSI Design **6**, 1-4, (1998).

[2] J. -P. Berenger, *A perfectly matched layer for the absorption of electromagnetic waves*, J. Comput. Phys., **114**, (1994).

[3] E. B. Brown, E. Wu, W. Zipfel, W. W. Webb, Biophys. Jour., **77**, 5, (1999).

[4] M. Chertkov, Y. Chung, A. Dyachenko, I. Gabitov, I. Kolokolov, and V. Lebedev, *Shedding and interaction of solitons in a weakly disordered optical fiber*, preprint.

[5] B. Engquist and A. Majda, *Absorbing boundary conditions for the numerical simulation of waves*, Math. Comput. **31**, (1977).

[6] E. A. Kuznetsov, A. V. Mikhailov, and I. A. Shimokhin, *Nonlinear interaction of solitons and radiation*, Phys. D. **87**, (1995).

[7] M. W. Kimmel, R. Trebino, J. Ranka, A. J. Stentz, CLEO 2000, CFL7, San Francisco.

[8] J. C. Knight, J. Broeng, T. A. Birks, and P. St. J. Russell, *Photonic band gap guidance in optical fibers*, Science **282**, (1998).

[9] F. G. Omenetto, Y. Chung, D. Yarotski, T. Schaefer, I. Gabitov, and A. J. Taylor, *Phase analysis of nonlinear femtosecond pulse propagation and self-frequency shift in optical fibers*, (submitted to Optics Communications).

[10] F. G. Omenetto, B. Luce, D. Yarotski, and A. J. Taylor, *Observation of chirped soliton dynamics at 1.55 nm in a single-model optical fiber with frequency-resolved optical gating*, Opt. Lett., **24**, (1999).

[11] F. G. Omenetto, B. Luce, and A. J. Taylor, *Genetic Algorithm pulse shaping for optimum femtosecond propagation in optical fibers*, JOSA B., **16**, 11, (1999).

TRANSCRIPT OF ACADEMIC RECORD

EWHA WOMANS UNIVERSITY
11-1 DAEHYON-DONG, SODAEMUN-KU, SEOUL 120-750, KOREA

DATE OF ISSUE : February 1, 1996
SERIAL NO. : 964929 - 11

NAME IN FULL : Chung, Yeo-Jin
STUDENT NO. : 9213060
DATE OF BIRTH : June 27, 1973
DATE OF ADMISSION : March 2, 1992

COLLEGE : Natural Sciences
DEPT. : Mathematics
STATUS : Enrolled as a senior
DEGREE : ***

SUBJECT	CREDIT	GRADE
1992 1ST SEMESTER		
KOREAN I	2.0	D+
GERMAN I	2.0	C
CALCULUS I	3.0	C-
ENGLISH I	3.0	B-
INTRODUCTION TO COMPUTER SCIENCE I	3.0	A
PHYSICAL EDUCATION I	1.0	C+
STATISTICS I	3.0	A
CHAPEL	1	
SEM CR= 17.0 GPA= 2.71	CUM CR= 17.0 GPA= 2.71	
1992 2ND SEMESTER		
KOREAN II	2.0	B-
GERMAN II	2.0	B+
CALCULUS II	3.0	A
INTRODUCTION TO LAW FOR EVERYDAY USE	3.0	B
ENGLISH II	3.0	B-
INTRODUCTION TO COMPUTER SCIENCE II	3.0	C
PHYSICAL EDUCATION II	1.0	C+
STATISTICS II	3.0	B
CHAPEL	1	
SEM CR= 20.0 GPA= 2.92	CUM CR= 37.0 GPA= 2.82	
1993 1ST SEMESTER		
INTRODUCTION TO CHRISTIANITY	3.0	A-
DIFFERENTIAL EQUATIONS	3.0	B
DEMOCRACY & KOREAN SOCIETY	2.0	B-
LINEAR ALGEBRA I	3.0	A
GENERAL PHYSICS	3.0	B
SET THEORY	3.0	C+
CHAPEL	1	
SEM CR= 17.0 GPA= 3.14	CUM CR= 54.0 GPA= 2.92	
1993 2ND SEMESTER		
ADVANCED CALCULUS I	3.0	A
INTRODUCTION TO EASTERN & WESTERN CLASSICS	2.0	B+
LINEAR ALGEBRA II	3.0	A
GENERAL CHEMISTRY	3.0	B-
THEORY OF NUMBERS	3.0	B+
PSYCHOLOGY OF ADOLESCENCE	3.0	A-
CULTURAL HISTORY OF KOREA	3.0	C+
CHAPEL	1	
SEM CR= 20.0 GPA= 3.33	CUM CR= 74.0 GPA= 3.03	
1994 1ST SEMESTER		
METRIC SPACES	3.0	A+
ADVANCED CALCULUS II	3.0	A
CALCULUS I	3.0	B-
COMPLEX ANALYSIS I	3.0	A+
SET THEORY	3.0	A-
THEORY OF MODERN ALGEBRA I	3.0	A
CHAPEL	1	
SEM CR= 18.0 GPA= 3.83	CUM CR= 86.0 GPA= 3.27	
1994 SUMMER SEMESTER		
INFORMATION SOCIETY & COMPUTERS	3.0	B
CHAPEL	0	
SEM CR= 3.0 GPA= 3.00	CUM CR= 89.0 GPA= 3.26	
1994 2ND SEMESTER		
ECONOMY & SOCIETY	3.0	A
DEVELOPMENT OF SCIENCE & MATHEMATICS	3.0	C+
COMPLEX ANALYSIS II	3.0	B+
TOPOLOGICAL SPACES	3.0	A+
THEORY OF MODERN ALGEBRA II	3.0	A+
PROBABILITY & STATISTICS I	3.0	B
CHAPEL	1	
SEM CR= 18.0 GPA= 3.53	CUM CR= 107.0 GPA= 3.31	
1995 1ST SEMESTER		
DIFFERENTIAL GEOMETRY I	3.0	A
UNDERSTANDING MODERN & CONTEMPORARY HISTORY OF WEST	3.0	A
NUMERICAL ANALYSIS	3.0	B
REAL ANALYSIS I	3.0	B
UNDERSTANDING MODERN STATISTICS	3.0	B+
PROBABILITY & STATISTICS II	3.0	B+
CHAPEL	1	
SEM CR= 18.0 GPA= 3.43	CUM CR= 125.0 GPA= 3.33	
1995 SUMMER SEMESTER		
HUMAN DEVELOPMENT & FAMILY	3.0	A
CHAPEL	0	
SEM CR= 3.0 GPA= 4.00	CUM CR= 128.0 GPA= 3.34	
1995 2ND SEMESTER		
DIFFERENTIAL GEOMETRY II	3.0	B+
CIVIL LIFE & LAW	3.0	A-
REAL ANALYSIS II	3.0	A
INTRODUCTION TO NATURAL SCIENCE	3.0	B+
COMPREHENSIVE EXAM		P
CHAPEL	1	
SEM CR= 12.0 GPA= 3.58	CUM CR= 140.0 GPA= 3.36	

TOTAL CREDITS : 140.0
TOTAL GPA : 3.36 (4.30)
*** END OF TRANSCRIPT ***

REMARKS:
1. HOURS-PER-WEEK:
   ONE HOUR OF CLASS WORK PER WEEK FOR 1 SEMESTER COUNTS FOR 1 CREDIT.
   TWO OR MORE HOURS OF LABORATORY WORK PER WEEK FOR 1 SEMESTER COUNT FOR 1 CREDIT.
2. WEEKS-PER-YEAR
   16 WEEKS MAKE 1 SEMESTER AND 2 SEMESTERS ONE ACADEMIC YEAR.
3. GRADING SYSTEM
   BEFORE 1954 : A(90-100), B(80-89), C(70-79), D(60-69), F(0-59), P(PASS)
   1955-1980 : A(4.0), B(3.0), C(2.0), D(1.0), F(0), P(PASS)
   1981-1993 : A+(4.3), A0(4.0), A-(3.7), B+(3.3), B0(3.0), B-(2.7), C+(2.3), C0(2.0), C-(1.7), D+(1.3), D0(1.0), D-(0.7), F(0), P(PASS),
   1994- : A+(4.3), A0(4.0), A-(3.7), B+(3.3), B0(3.0), B-(2.7), C+(2.3), C0(2.0), C-(1.7), D+(1.3), D0(1.0), D-(0.7), F(0), P(PASS), S(SATISFACTORY), U(UNSATISFACTORY)
4. REQUIRED CREDITS:

Joon Woo Park

Joon Woo Park
Dean of Academic Affairs

609-92-8418 14123-633 G CHUNG,YEO-JIN GRAD DIV MATHEMATICS

NON-RESIDENT SEP 1996 SEOUL, KOREA 06/27/73 GRADUATE

CFUN 12/14/01 01/10/02

- LANGUAGE EXAMS -
GERMAN PASSED 04/16/98

- MASTERS DEGREES -
ADVANCED TO CANDIDACY - 05/06/98
PLAN II - COMPREHENSIVE EXAMINATION OF MATHEMATICS PASSED 09/16/98
DEGREE CONFERRED - SEPTEMBER 16, 1998
MS MATHEMATICS

- DOCTORS DEGREES -
ADVANCED TO CANDIDACY - 06/08/00

- CAMPUS MAIL ADDRESS -
6470 ADOBE CIRCLE ROAD SO
IRVINE, CA
92612 949 854-1954

- ADVISOR:

-LEVEL: 7 -ADVANCED: S00 -TERMS: 04

FALL QUARTER 1996

711	REAL ANALYSIS	MATH	210A	4.0	A-	14.8	
712	ANALYTIC FNCTN THRY	MATH	220A	4.0	B	12.0	
713	APPL NONLIN ANALYS	MATH	294A	4.0	A	16.0	
	TERM TOTALS: 3.567 GPA			12.0		42.8	
12.0* ATTM	12.0* PSSD 42.8* G.P.			6.8 BAL		3.567 GPA	

WINTER QUARTER 1997

714	REAL ANALYSIS	MATH	210B	4.0	B+	13.2	
715	ANALYTIC FNCTN THRY	MATH	220B	4.0	A-	14.8	
716	APPL NONLIN ANALYS	MATH	294B	4.0	A	16.0	
	TERM TOTALS: 3.667 GPA			12.0		44.0	
24.0* ATTM	24.0* PSSD 86.8* G.P.			14.8 BAL		3.617 GPA	

SPRING QUARTER 1997

717	REAL ANALYSIS	MATH	210C	4.0	B	12.0	
718	ANALYTIC FNCTN THRY	MATH	220C	4.0	B	12.0	
719	APPL NONLIN ANALYS	MATH	294C	4.0	A	16.0	
	TERM TOTALS: 3.333 GPA			12.0		40.0	
36.0* ATTM	36.0* PSSD 126.8* G.P.			18.8 BAL		3.522 GPA	

FALL QUARTER 1997

720	ALGEBRA	MATH	230A	4.0	B	12.0	
721	FUNCTIONAL ANALYSIS	MATH	260A	4.0	A	16.0	
722	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 3.500 GPA			8.0		28.0	
44.0* ATTM	44.0* PSSD 154.8* G.P.			22.8 BAL		3.518 GPA	

WINTER QUARTER 1998

723	ALGEBRA	MATH	230B	4.0	A-	14.8	
724	FUNCTIONAL ANALYSIS	MATH	260B	4.0	A	16.0	
725	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 3.850 GPA			8.0		30.8	
52.0* ATTM	52.0* PSSD 185.6* G.P.			29.6 BAL		3.569 GPA	

SPRING QUARTER 1998

726	ALGEBRA	MATH	230C	4.0	A	16.0	
727	FUNCTIONAL ANALYSIS	MATH	260C	4.0	A	16.0	
728	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			8.0		32.0	
60.0* ATTM	60.0* PSSD 217.6* G.P.			37.6 BAL		3.627 GPA	

FALL QUARTER 1998

729	APPLIED MATHEMATICS	MATH	292A	4.0	A	16.0	
730	PARTIAL DIFF EQNS	MATH	295A	4.0	A+	16.0	
731	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			8.0		32.0	
68.0* ATTM	68.0* PSSD 249.6* G.P.			45.6 BAL		3.671 GPA	

WINTER QUARTER 1999

732	APPLIED MATHEMATICS	MATH	292B	4.0	A	16.0	
733	PARTIAL DIFF EQNS	MATH	295B	4.0	A	16.0	
734	APPLIED & COMP MATH	MATH	298B	2.0	A	8.0	
735	SUP-READING-RSCH	MATH	299B	2.0	A	8.0	
736	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			12.0		48.0	
80.0* ATTM	80.0* PSSD 297.6* G.P.			57.6 BAL		3.720 GPA	

SPRING QUARTER 1999

737	PERTURB METH IN ENG	ENGRMAE	205	3.0	A	12.0	
738	SEMINAR	MATH	298C	2.0	A	8.0	
739	SUP-READING-RSCH	MATH	299C	3.0	A	12.0	
740	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			8.0		32.0	
88.0* ATTM	88.0* PSSD 329.6* G.P.			65.6 BAL		3.745 GPA	

FALL QUARTER 1999

741	APPLIED MATHEMATICS	MATH	292A	4.0	A	16.0	
742	APPL NONLIN ANALYS	MATH	294A	4.0	A	16.0	
743	APPL/COMP MATH	MATH	298A	2.0	A	8.0	
744	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			10.0		40.0	
98.0* ATTM	98.0* PSSD 369.6* G.P.			75.6 BAL		3.771 GPA	

WINTER QUARTER 2000

745	APPLIED MATHEMATICS	MATH	292B	4.0	A	16.0	
746	APPL NONLIN ANALYS	MATH	294B	4.0	A	16.0	
747	APPLIED/COMP. MATH	MATH	298B	2.0	A	8.0	
748	SUP-READING-RSCH	MATH	299B	4.0	A	16.0	
	TERM TOTALS: 4.000 GPA			14.0		56.0	
112.0* ATTM	112.0* PSSD 425.6* G.P.			89.6 BAL		3.800 GPA	

SPRING QUARTER 2000

749	APPLIED MATHEMATICS	MATH	292C	4.0	A	16.0	
750	APPL NONLIN ANALYS	MATH	294C	4.0	A	16.0	
751	SEMINAR	MATH	298C	2.0	A	8.0	
752	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 4.000 GPA			10.0		40.0	
122.0* ATTM	122.0* PSSD 465.6* G.P.			99.6 BAL		3.816 GPA	

SECOND SUMMER SESSION 2000

753	SUP-READING-RSCH	MATH	299A	4.0	A	16.0	
	TERM TOTALS: 4.000 GPA			4.0		16.0	
126.0* ATTM	126.0* PSSD 481.6* G.P.			103.6 BAL		3.822 GPA	

FALL QUARTER 2000

754	COMPUTATIONAL PDES	MATH	226A	6.0	A	24.0	
755	SUP-READING-RSCH	MATH	299A	4.0	F	0.0	NR
756	UNIVERSITY TEACHING	MATH	399	4.0	S		SU
	TERM TOTALS: 2.400 GPA			10.0		24.0	
136.0* ATTM	132.0* PSSD 505.6* G.P.			97.6 BAL		3.718 GPA	

WINTER QUARTER 2001

757	SUP-READING-RSCH	MATH	299B	12.0	A	48.0	
	TERM TOTALS: 4.000 GPA			12.0		48.0	
148.0* ATTM	144.0* PSSD 553.6* G.P.			109.6 BAL		3.741 GPA	

SPRING QUARTER 2001

758	SUP-READING-RSCH	MATH	299C	12.0	A	48.0	
	TERM TOTALS: 4.000 GPA			12.0		48.0	
160.0* ATTM	156.0* PSSD 601.6* G.P.			121.6 BAL		3.760 GPA	

FIRST SUMMER SESSION 2001

759	SUP-READING-RSCH	MATH	299A	2.0	P		P/NP
	TERM TOTALS: 0.000 GPA			0.0		0.0	
160.0* ATTM	156.0* PSSD 601.6* G.P.			121.6 BAL		3.760 GPA	

SECOND SUMMER SESSION 2001

760	SUP-READING-RSCH	MATH	299A	2.0	P		P/NP

609-92-8418 14123-633 G CHUNG,YEO-JIN GRAD DIV MATHEMATICS

NON-RESIDENT SEP 1996 SEOUL, KOREA 06/27/73 GRADUATE

CFUN 12/14/01 01/10/02

TERM TOTALS: 0.000 GPA 0.0 0.0
160.0* ATTM 156.0* PSSD 601.6* G.P. 121.6 BAL 3.760 GPA

FALL QUARTER 2001

761	SEMINAR	MATH	298A	2.0	A	8.0
762	SEMINAR	MATH	298A	2.0	A	8.0
763	SUP-READING-RSCH	MATH	299A	12.0	A	48.0

TERM TOTALS: 4.000 GPA 16.0 64.0
176.0* ATTM 172.0* PSSD 665.6* G.P. 137.6 BAL 3.782 GPA

TOTAL PASS/NOT PASS ATTM 40.0 PASSED 40.0

QUARTER CREDITS COMPLETED 212.0 UC GPA 3.782

Los Alamos
NATIONAL LABORATORY

Human Resources Division - Mail Stop P286
Los Alamos, New Mexico 87545

PERSONAL DEMOGRAPHIC DATA

CHUNG YEO-JIN

Name (*Last, First, Middle*) *Please Print or Type*

RID (for HR-S use only)
RID#

Los Alamos National Laboratory is asking all applicants for employment to complete this form in order to comply with Federal Affirmative Action and Equal Employment Opportunity requirements. Data collected will be used for statistical purposes and to measure effectiveness of recruitment efforts. This information is being requested on a voluntary basis. No adverse consequences will affect you, should you choose not to provide this information. Information regarding access to Laboratory records which contain personal information about you may be obtained by contacting the Information Practices Office at the Laboratory.

Note: A test is required for some secretarial and clerical positions. Call (505) 667-1844 to schedule a testing time.

Instructions: Please identify the appropriate race or ethnic category, veteran, disability status, gender, Social Security Number and birth date by marking or filling in the appropriate boxes. If two or more ethnic categories are applicable, choose the one category with which you most closely identify.

Racial or Ethnic Category

☐	**White** *Not of Hispanic Origin*	A person having origins in any of the peoples of Europe, North Africa, or the Middle East
☐	**Hispanic**	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race
☐	**American Indian or Alaskan Native**	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition
☒	**Asian or Pacific Islander**	A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands
☐	**Black** *Not of Hispanic Origin*	A person having origins in any of the Black racial groups of Africa

Veteran Information

Yes	No		
☐	☒	**Are you a veteran of the Vietnam era?**	Served on active duty for a period of more than 180 days--any part of which occurred between August 5, 1964 & May 7, 1973

Disability Information

Yes	No		
☐	☒	**Are you a special disabled veteran?**	10% or more disability rating with a serious employment disability.
☐	☒	**Are you disabled?**	If you are disabled, it would assist us if you would tell us the accommodations we might make, that would enable you to perform job requirements properly and safely. Please specify your disability .

Are you a U.S. Citizen? ☐ Yes ☒ No		**Are you a Permanent Resident Alien?** ☐ Yes ☒ No	
Gender ☐ Male ☒ Female	**Social Security Number** 609-92-8418	**Date of Birth** June. 27. 1973	

Yeo-Jin

Signature

Jan. 10. 2002

Date

Form Revised 4/15/96

UNIVERSITY OF CALIFORNIA, IRVINE

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Department of Mathematics

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Fax: (949) 824-7993
E-mail: etiti@math.uci.edu

January 19, 2002

This is a strong letter of recommendation supporting the application of Ms. **Yeojin Chung** for a postdoctoral position at the Los Alamos National Laboratory. Ms. Chung is doing her Ph. D. in Applied and Computational Mathematics under my supervision at the University of California - Irvine (UCI). Currently, she is in the process of writing her Ph. D. thesis; which she is expected to defend by June, 2002.

Yeojin's thesis consists of two parts. In the first part she presents a rigorous analytical study of the Moore–Greitzer model for turbo-machine engines. Based on carefully performed numerical experiments and computational studies of the global bifurcation diagram for the Moore–Greitzer model various scientists have asserted the low dimensional long-time behavior of this model. In this part of her thesis Yeojin develops two different analytical approaches to justify the above claim. First, she establishes the global well-posedness, and certain Gevrey class regularity of the solutions to this model. As a result of this special class of Gevrey regularity she is able to prove that the Fourier coefficients of any solution decay to zero at a uniform exponential rate, as the wave numbers tend to infinity. Consequently, the modes corresponding to the high wave numbers posses exponentially small amount of energy, and almost all the energy is contained in finite number of Fourier modes (the lower ones), a clear indication of low dimensional dynamical behavior. Furthermore, she is also able to conclude, as a result of this special Gevrey regularity, that the Galerkin numerical scheme converges exponentially fast to the exact solution. Hence, the Galerkin method is a very reliable numerical procedure for numerical simulations. In addition, she has also shown that the Moore–Greitzer model posses a globally invariant finite dimensional Inertial Manifold. Thereby the asymptotic dynamics of this model is completely determined by a finite system of ordinary differential equations. As a result one can design a finite dimensional feedback controller to stabilize the dynamics of this model. The results of this part of her thesis have been submitted for publication in the journal of *"Nonlinear Science"*.

The other part of her thesis is completely different and is based on her collaborative work with a group of scientists at the *"Center for Nonlinear Studies"* in the Los Alamos National Laboratory (LANL) under the guidance of Dr. Ildar Gabitov. It is concerned with the Raman effect of the pulse in fiber optics. She spent almost 3 months in summer 2000 at the LANL working on this project. Mainly she was performing numerical simulations for the nonlinear Shrödinger equation focusing on the Raman effect of the pulse and comparing the results of her numerical simulations to the experiment data that was produced simultaneously by other members of the group. They have obtained satisfactory preliminary results and good agreement between the numerical and experimental data. Between January and September

2001 Yeojin was back to LANL to finish this part of her thesis and to perform further numerical tests to compare the phase shift of the pulse with the corresponding empirical data. Most importantly she has been working very hard on providing rigorous analytical justification, using perturbation techniques, to the validity of the mathematical model she has been using in her simulation. She has already submitted one paper based on her joint work with the LANL team, and currently they in the process of finishing another two papers, to be submitted for publication in refereed journals.

In summary, Ms. Chung is a very hard working and strongly motivated young applied mathematician. She is an expert in multi-scale asymptotic analysis and on the Mathematical Theory of the Navier–Stokes equations and other related nonlinear PDEs. She has gained a lot of computational experience from working in LANL, and from the various numerical analysis courses she took at UCI. Yeojin has a very pleasant personality and is a great and cooperative team player. Based on the results of her thesis she will end up writing about 4 papers all publishable in reputable refereed journal; which is considered an exceptional performance for a Ph. D. in Mathematics. Based on the above I strongly recommend her to you without any reservations.

Please do not hesitate to contact me if I can be of any further assistance.

Sincerely yours,

Edriss S. Titi
Professor of Applied Mathematics,
Mechanical & Aerospace Engineering

LETTER OF RECOMMENDATION

FOR

Yeo-jin Chung

I have been asked by Dr. Yeo-jin Chung to write a letter on her behalf, and I gladly do so. I first met Dr. Chung in November 2001 at an American Mathematical Society meeting in Irvine, California. I attended her talk at the meeting, and subsequently I have read some of her papers.

I was quite impressed by her presentation at the meeting in Irvine. She is articulate and gave a well-organized talk. She was asked some difficult questions and fielded them with enviable confidence. It was an excellent talk. Even more impressive for someone just finishing their Ph.D. Since success in the mathematical sciences involves more than just solving problems - but also presenting and conveying ideas, I think Dr. Chung has a promising academic future.

I have also read some of her papers. In particular, I have read throughly the paper *Inertial Manifolds and Gevrey Regularity for the Moore-Greitzer Model of Turbo-Machine Engine*. The paper is based on her Ph.D thesis. I will not go into the specific mathematical technicalities of the paper. However, I would like to give a brief indication of the breath of knowledge and originality required to write the paper. Of course the work is a joint effort with her advisor Professor E.S. Titi. However, being a former student of Professor Titi, I know he is extremely demanding and insists students solve their own problems.

The paper starts by casting a model of a turbo machine into a usable mathematical framework. Specifically, the model must be formulated on appropriate Hilbert spaces. The model in the paper has some interesting features which complicate, compared to other dissipative partial differential equation originating in engineering, this procedure.

The next step requires a proof that solutions of the model exist. The proof used is fairly standard in this area - start with a numerical approximation of the equations, here a spectral approximation, and pass to the limit. The details are not trivial but are well known. Once solutions are known to exist, the more difficult task to discover their regularity follows. She shows the Fourier coefficients of the solution decay exponentially in wave number. This in turn implies a spectral approximation of the governing equations converges exponentially in wave number. The result corroborates the behavior of the model observed by engineers conducting numerical experiments.

Finally, the long-time dynamics of the modes is examined. She shows the existence of an inertial manifold - a finite-dimensional invariant manifold attracting all orbits. The proof here is interesting because it is does not employ the usual methods to show the existence of an inertial manifold. Because of the mathematical form of the equations, the so called spectral barrier method is used. This requires a substantial understanding of inertial manifolds to know the intricacies in the hypotheses required to show the existence of the manifold.

Dr. Chung has an exceptional dissertation. It contains ideas from many ares of mathematics put together in an original way. Moreover, it provides the preparation and groundwork for Dr. Chung to immediately contribute as Post-Doctoral fellow at CNLS.

Sincerely,

Don A. Jones
Associate Professor
Arizona State University
Department of Mathematics

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SANTA BARBARA, CALIFORNIA 93106-3080

January 23, 2002

Dr. Misha Chertkov
Los Alamos National Laboratory
CNLS and T-13
Los Alamos, NM 87545

Dear sirs,

It is a great pleasure to recommend Yeo-Jin Chung for a postdoctoral position. I have known Yeo-Jin for a couple of years or since I visited Irvine and learned about her thesis project. I have followed her research with interest since then. The part that I understand best is her work on the viscous Moore-Greitzer equation (vMG) that describes the flow of air through a jet engine. These equations, that only recently have been rigorously justified, were derived by Moore and Greitzer about twenty years ago. The vMG equations have proven their worth and give good qualitative agreements with experiments performed on laboratory compressors and real jet engines. A graduate student of mine Hoskuldur Hauksson proved some year ago, with small help from me, that the vMG equations has a finite-dimensional attractor and estimated its dimension. Yeo-Jin has improved this result considerably with her thesis advisor Edriss Titi and showed that the solutions possess Geverey regularity and that there exists an intertial manifold. These are very nice results and make and impressive paper. On basis of this result alone I believe that Yeo-Jin deserves a postdoctoral position at Los Alamos.

Yeo-Jins research on optical fibers is also very impressive and close to the research interests of people at Los Alamos. I think this work together with her work on the jet-engine flow makes her a strong candidate.

Sincerely yours,

Björn Birnir

Björn Birnir
Professor